10.00 – 10.15	WELCOME
10.15 – 11.00	Quality management of mineral recycling products, use of recycled aggregates in Austria, experiences with green public procurement *Dipl.-Ing. Martin Car* *Der ÖsterreichischeBaustoff-RecyclingVerband*
11.00 – 11.15	QUESTIONS

Euroopa Liit
Euroopa
Regionaalarengu Fond

Eesti tuleviku heaks

EJKL
ESTONIAN RECYCLING
COMPETENCE CENTER

TEEDEKLASTER
ESTONIAN ROAD CLUSTER

Quality management of mineral recycling products, use of recycled aggregates in Austria, experiences with green public procurement

Dipl.-Ing. Martin Car
Austrian Association for the Recycling of Building Materials

International Conference
October 9th - 10th 2014
Tallinn, Estonia

Österreichischer Baustoff-Recycling Verband

Austria in facts & figures

AUSTRIA

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International Conference
October 9th - 10th 2014
Tallinn, Estonia

Österreichischer Baustoff-Recycling Verband

Austria in general

Area total:	**83.879 km² (2014)**
Population:	**8.507.786 (2014)**
Density:	**101/km² (2014)**
Gross Domestic Product:	**€ 313 billion (2013)**
Active Companies:	**406.787 (2012)**
Employees:	**3.469.667 (2012)**

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Who are we?

The Association

The association was founded in 1990 by 14 companies. It is a voluntary association of recycling companies and provides advocacy for the building material recycling economy. The number of members has grown to 80, the number of building materials recycling facilities throughout the country is also increasing.

The Function

The Austrian Association for the Recycling of Building Materials sees itself as a partner for private and public entities (federal, state, local, special societies) and the Ministry of Environment in terms of recycling of building materials.

Dipl.-Ing. Martin Car

Who are we?

The Organisation

The BRV – Austrian Construction Materials Recycling Association – works nationwide and across all industries. This is assured by an appropriately constituted board, which meets every two to three months under the chairmanship of the President of the BRV Ing. Günter Gretzmacher. The agenda and related topics are selected by the general assembly. To quickly deal with occurring problems, specialist groups, corporate and external experts may get involved.

The office of the BRV is located in Vienna and managed by the director Dipl.-Ing., Martin Car.

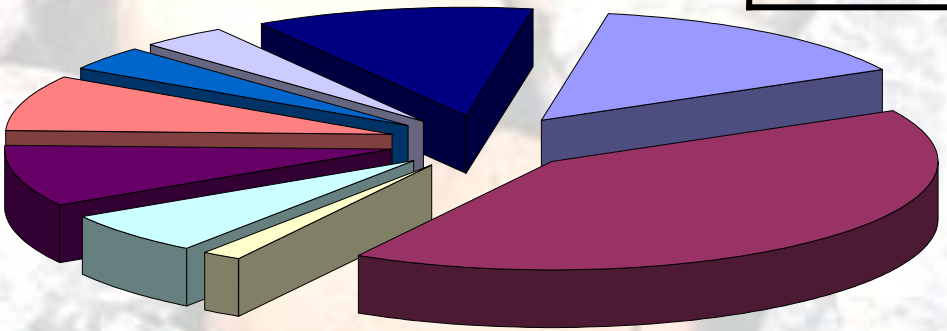
Waste in Austria

Total waste: 51,7 mio. t (2009)

Waste from construction industry: 6,9 mio. t/year (2009):

construction and demolition waste	
building waste (brick...)	3.200.000 t
roadway waste (asphalt)	1.300.000 t
track ballast	370.000 t
concrete waste	1.700.000 t
construction waste	300.000 t

13,3 % of total waste



recycling rate = 80 %

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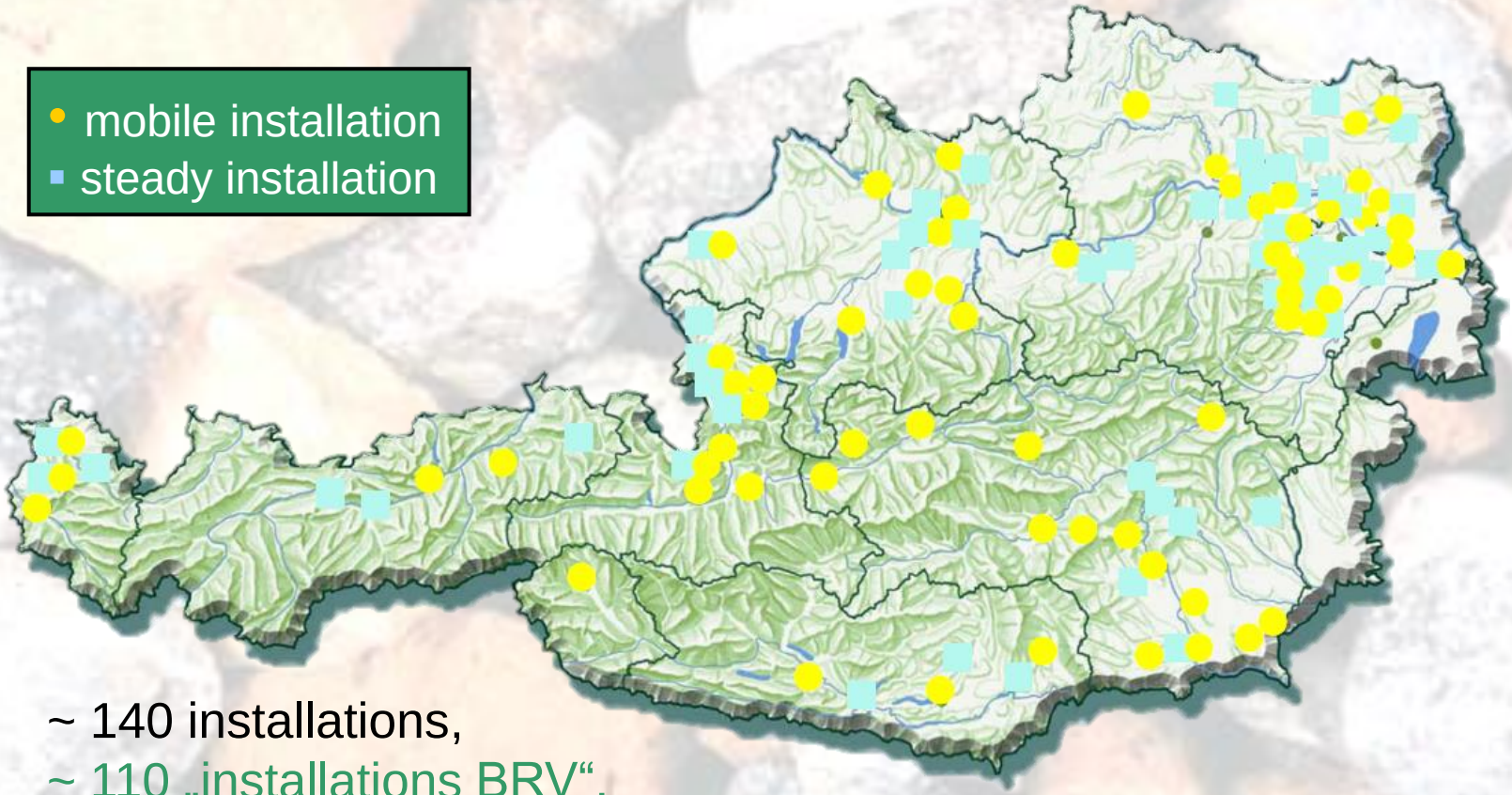
Installations for recycling of building materials in Austria



~ 140 installations,
~ 110 „installations BRV“,
thereof 65 mobile installations

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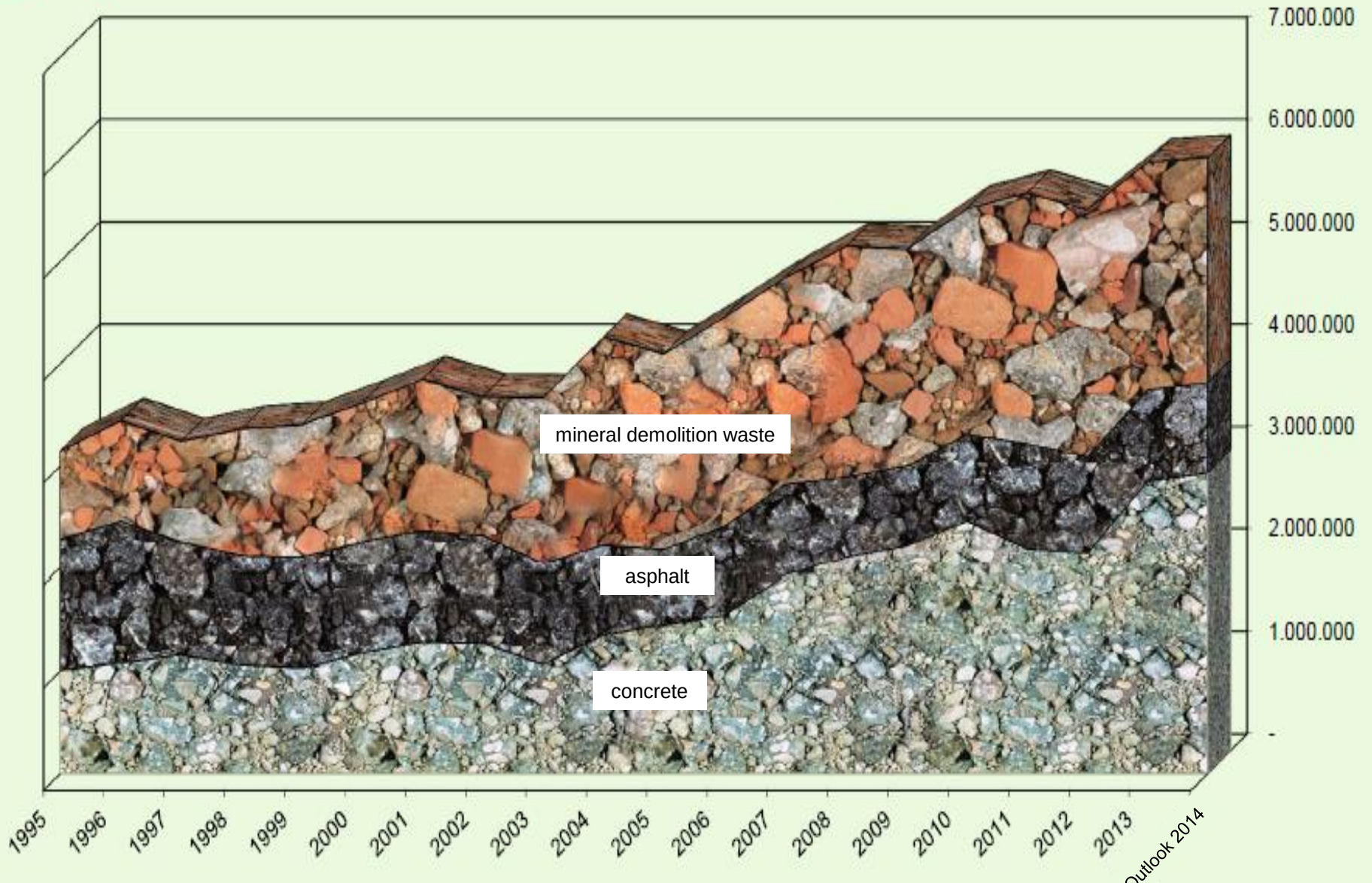
Recycled construction materials
1995 – outlook 2014
Austria



EU Construction Products Directive (CPD)

The “basic requirements” on buildings are the basis for the elaboration of standardization assignments and was now extended (see article 7) and supplemented (e.g. article 6):

The basic requirements are (annex 1 of the EU Construction Products Directive):

- mechanical strengh and stability
- fire prevention
- hygiene, health and environment
- safety and accessibility utilization
- acoustic protection
- energy saving and thermal protection
- **sustainable utilization of natural resources (NEW)**

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CEN European Committee for Standardization
TC 154 – "Aggregates"

SC1	Aggregates for mortar	EN 13 139
SC2	Aggregates for concrete	EN 12 620
SC3	Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas	EN 13 043
SC4	Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction	EN 13 242
SC5	Lightweight aggregates	EN 13 055
SC6	Test standards	EN 933-1-11 EN 1097
	Evaluation of conformity of aggregates – Initial Type Testing and Factory Production Control	EN 16 236

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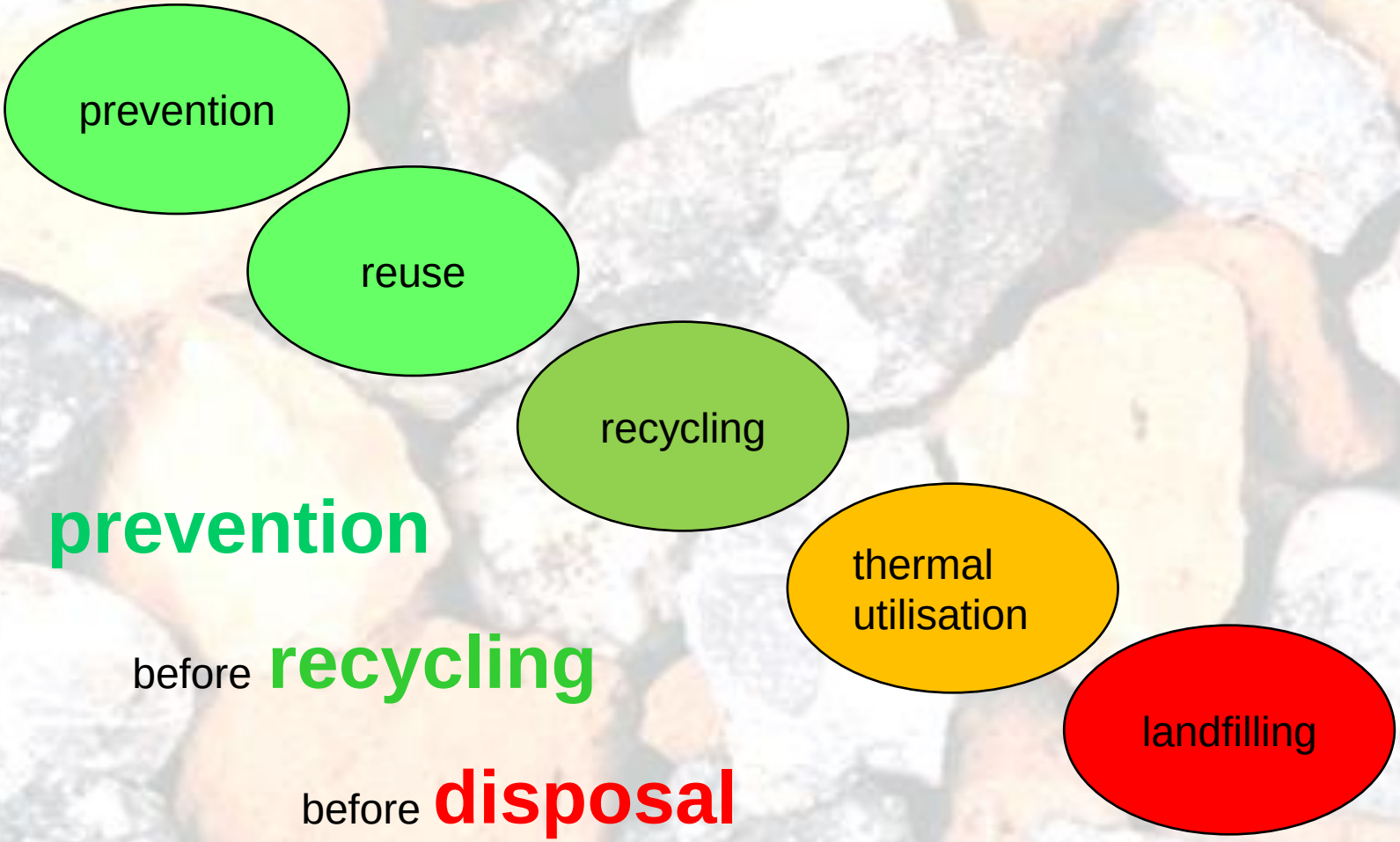
EU-waste hierarchy



prevention

before **recycling**

before **disposal**

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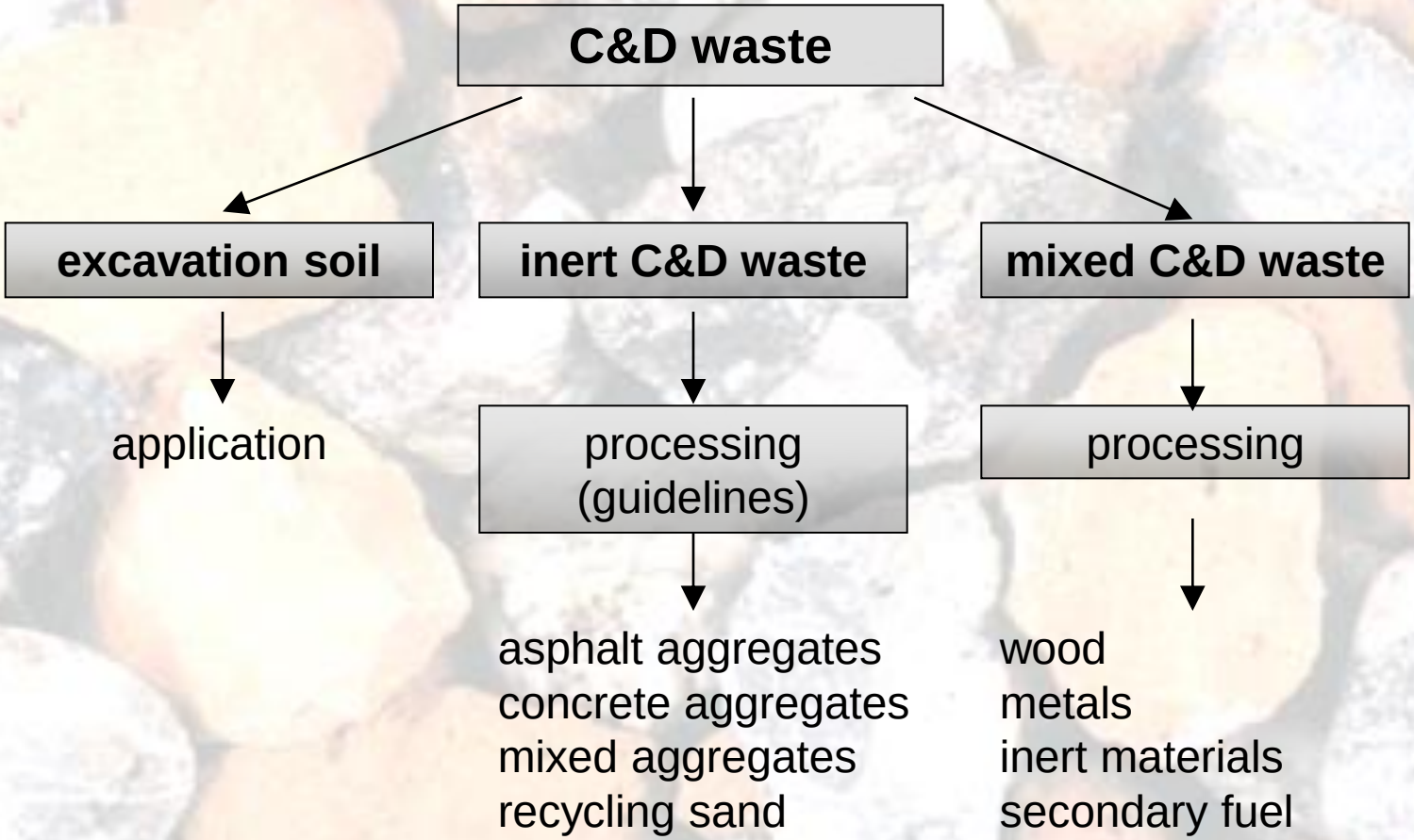
Development of guidelines



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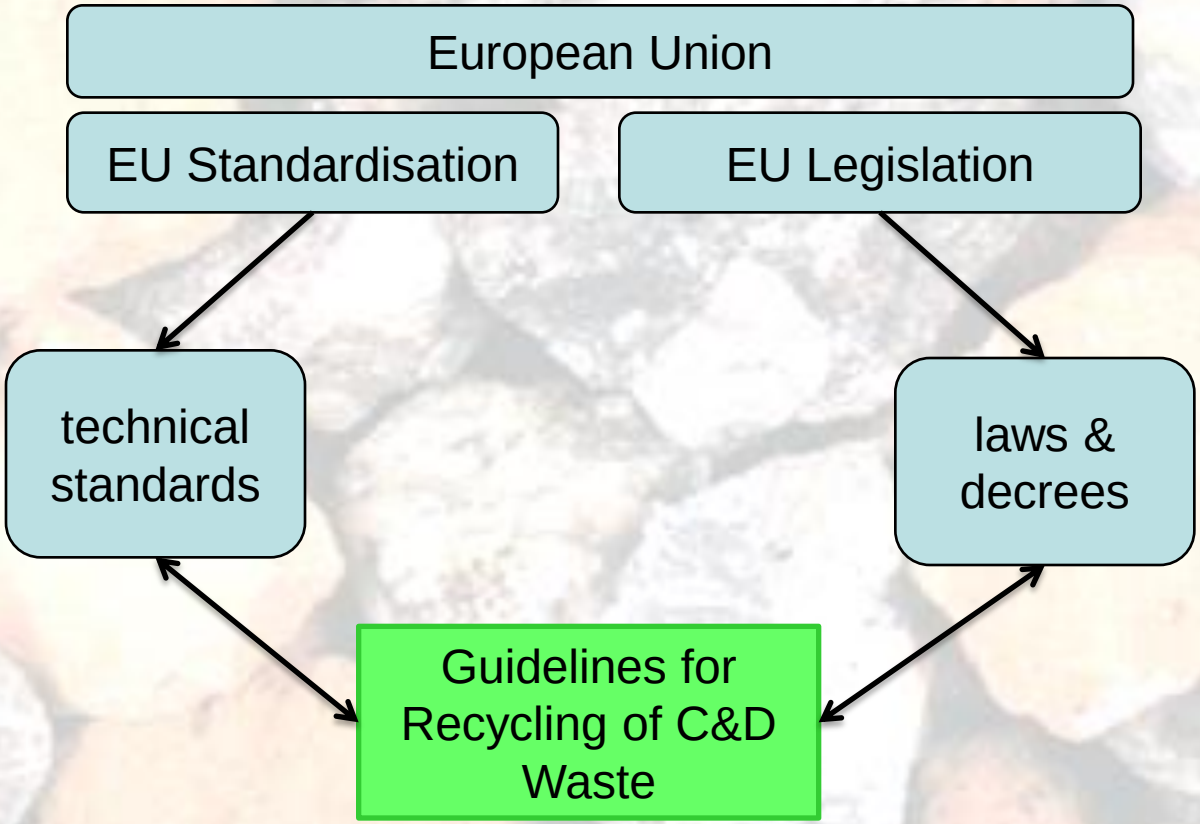
Development of guidelines



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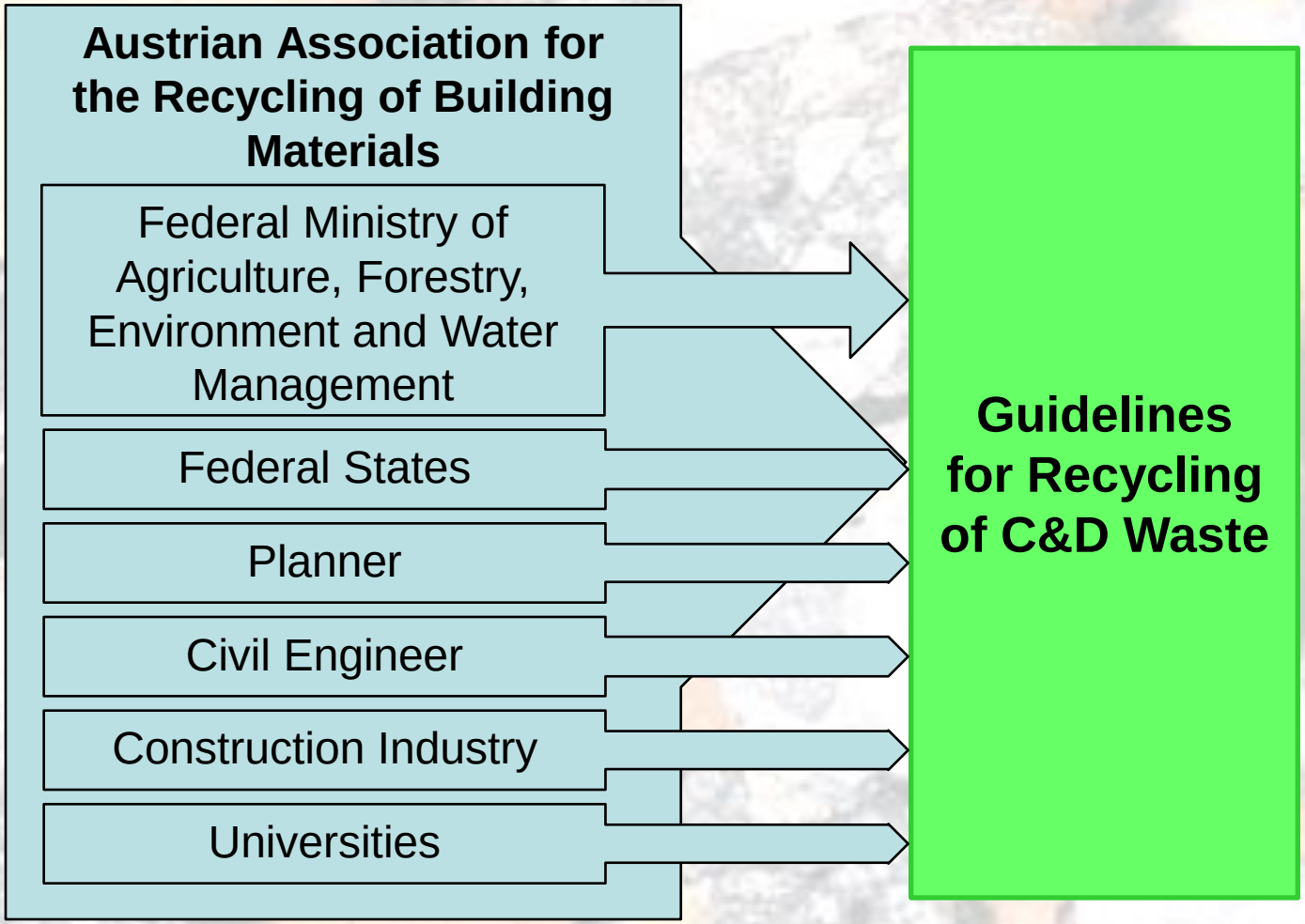
Development of guidelines



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Technical guidelines and bulletins

Guideline for Recycled Building Materials:

- field of application
- norms and technical regulations
- general requirements
- engineering properties – grading regulations
- enviromental compatibility – quality regulations
- applications
- grade and quality surveillance
- acquiring of quality marks for recycled building materials

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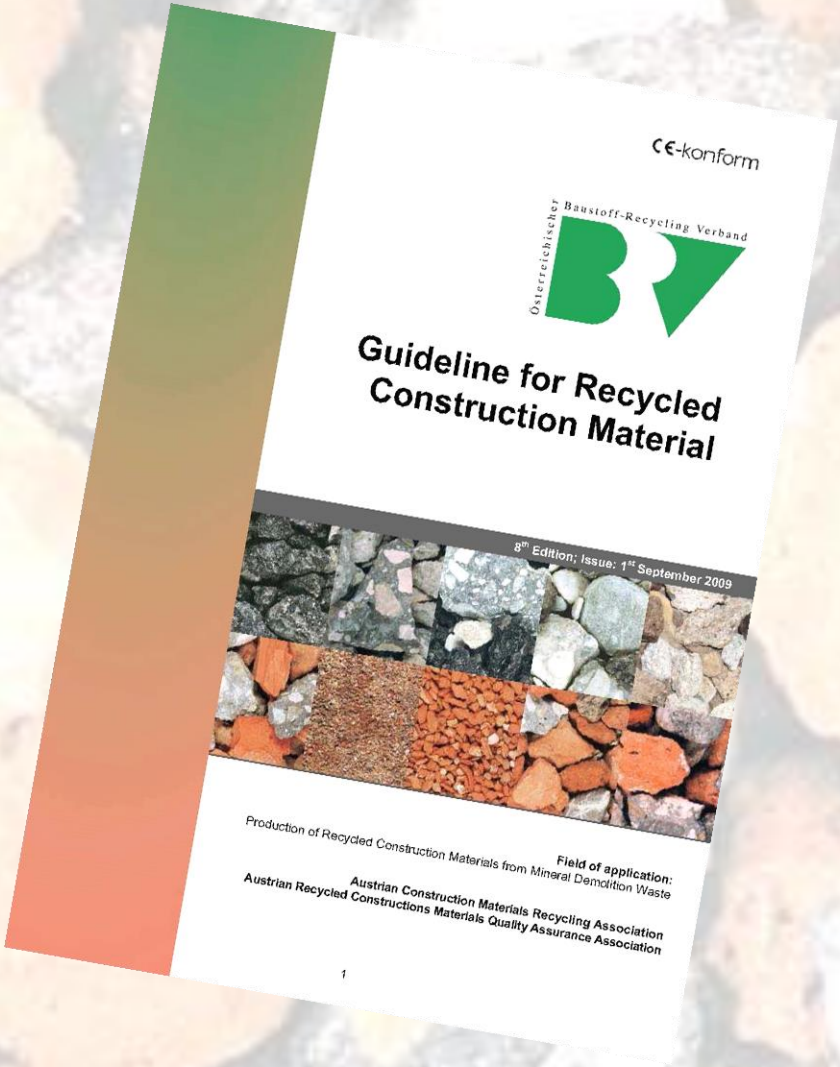
Österreichischer Baustoff-Recycling Verband

International Conference
October 9th - 10th 2014
Tallinn, Estonia

Guideline for Recycled Construction Material

8th Edition; Issue: 1st September 2009



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Field of application

This guideline regulates the production of quality proven recycled construction materials made from demolition waste for standardized applications. Setting grade and quality standards it also determines the kind and the extent of assessments which have to be carried out on recycled construction materials.

The regulations for each applicable field are contained in the following annexes:

Green Annex:

reuse/recycling of hydraulically or bituminous bound and unbound mineral demolition waste

Red Annex:

- unbound materials
- cement bound materials
- recycled sand from mineral waste

Dipl.-Ing. Martin Car

Designation of recycled construction materials

designation of materials:

according to the „Green Annex”:

RA	Recycled crushed asphalt granulate
RAB	Recycled crushed mixed asphalt and concrete granulate
RB	Recycled crushed concrete granulate
RG	Recycled granulate of stone (natural and/or recycled) with a maximum content of concrete and/or asphalt of 50%
RM	Recycled crushed granulate mix of concrete and/or asphalt with a maximum content of stone (natural and/or recycled) of 50%

Designation of recycled construction materials

designation of materials:

according to the „Red Annex“

RH	Recycled sand from above ground structures; recycled gravel from above ground structures
RHZ	Recycled sand from bricks used for above ground structures; recycled gravel from bricks used for above ground structures
RMH	Recycled mineral demolition waste from above-ground structures with a possible content of natural stone
RS	Recycled sand
RZ	Recycled sand from bricks; recycled gravel from bricks

The extension “z“ (e.g. RBz) is used for recycled construction materials which according to the Austrian Standard ÖNORM EN 12620 may be used as concrete aggregates.

Dipl.-Ing. Martin Car

Grade classes – civil engineering classification scheme

Recycled construction materials are classified in the following grades:

Grade S
Frost proof and frost resistant recycled construction materials used in road construction for unbound upper layers and sub-base layers (according to RVS 08.15.01) providing increased resistance against fragmentation as well as for the production of hydraulically or bituminous bound base layers (according to RVS 08.17.01).

Grade I
Frost proof and frost resistant recycled construction materials used in road construction for unbound upper layers and sub-base layers (according to RVS 08.15.01) as well as for the production of hydraulically or bituminous bound base layers (according to RVS 08.17.01).

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Österreichischer Baustoff-Recycling Verband

Grade classes – civil engineering classification scheme

Recycled construction materials are classified in the following grades:

Grade II
Frost proof and frost resistant recycled construction materials used in road construction for unbound sub-base layers (according to RVS 08.15.01) as well as for the production of hydraulically bound base layers (according to RVS 08.17.01).

Grade III and IV
Recycled construction materials to be used for both hydraulically bound base layers and filling materials for roads, parking areas, noise protection walls, general filling, trench filling and ground improvement.

Dipl.-Ing. Martin Car

Environmental compatibility – quality determination

Quality Classes

Recycled construction materials, produced in recycling plants, are classified into quality classes according to their composition. The classes are defined by means of a list of parameters and associated limit values.

Fields of Application

In order to regulate the sustainable use of recycled construction materials in an environmental point of view, it is necessary to determine the type of application with regard to hydro-geological application areas. Fundamentally, the use of recycled construction materials of quality class A^+ is permitted in water-source preservation areas and in areas with set conditions for water management.

Dipl.-Ing. Martin Car

Environmental compatibility – quality determination

→ **Fields of Application**

The use of recycled construction materials of quality class A+, A and B is subject to defined conditions. This means that the quality of recycled construction materials is directly related to the possible use.

An area is to be considered less delicate in respect of hydro-geological conditions if it shows the following criteria:

- existence and sufficient efficiency of layers with low permeability
- sufficient distance from ground water supplies

The application of recycled construction materials is not permitted in

- water-source protection areas
- areas with changing groundwater levels

The use of recycled construction materials of quality class C is permitted only for construction engineering purposes within a waste site (sub)class for not-harmful waste.

Dipl.-Ing. Martin Car

Environmental compatibility – quality determination

Parameter	unit	according to	quality class A+	quality class A	quality class B
Eluate (is to be produced according to ÖNORM EN 12457-4)					
PH value	-	ISO 10523	7.5 - 12.5 [2)]	7.5–12.5 [2)]	7.5–12.5 [2)]
Electric conductivity	mS/m	ÖNORM EN 27888	150 [1)2)]	150 [1)2)]	150 [1)2)]
Chromium $_{total}$	mg/kg DM	ÖNORM EN ISO 11885	0.3	0.5	1
Copperr	mg/kg DM	ÖNORM EN ISO 11885	0.5	1	2
Ammonium-N [6)]	mg/kg DM	ÖNORM ISO 7150-1	1	4	8
Nitrite-N [6)]	mg/kg DM	ÖNORM EN 26777	0.5	1	2
Sulphate-SO_4	mg/kg DM	ÖNORM EN ISO 10304-1	1,500	2,500	6,000 [3)]
Index of carbon hydrides [4)]	mg/kg DM	ÖNORM EN 9377-2	1	3	5
Total content					
∑16 PAH according to EPO [5)]	mg/kg DM	ÖNORM L 1200 after drying the sample at 30°C	4	12	20

1) If the pH-value is between 11.0 and 12.5 the limit value of the electric conductivity is 200mS/m
2) If this value is exceeded see G4.1.4
3) If the Ca/SO_4 ratio in the eluate is ≥ 0.43 the limit value is 8,000mg/kg DM.
4) The eluate must be collected by centrifugation according to ÖNORM S 2115.
5) This test may be omitted if the asphalt content does not exceed a maximum of 5% by mass
6) The limit value is considered met if the arithmetical average value of all test results of the last 12 months does not exceed the limit value and if none of the test results exceeds the respective tolerance value. For calculation of the tolerance values see point A7.3.2.

Environmental engineering applicable fields (minimum)

Form of application	Hydro-geolocial delicate area	Hydro-geological less delicate area
Unbound without cover layer [1]	Quality class A^+	Quality classes [2] A^+, A
Unbound with cover layer [1] or in bound form with or without cover layer [1]	Quality classes [3] A^+, A	Quality classes A^+, A, B
Aggregate	Quality classes A^+, A, B	Quality classes A^+, A, B

[1] Definition of the cover layer according to RVS 01.02.11, fundamentals; definition of terms, civil engineering

[2] Recycled construction materials of other quality classes with layer thickness and volume not exceeding a maximum of respectively 2m and 20,000m³ may also be used, if none of the limit values set for quality class A than that of the parameter of sulphate is exceeded and if this parameter does not exceed a maximum of 4,500 mg/kg DM.

[3] Recycled construction materials of other quality classes may be used for applications including cover layers, if none of the limit values set for quality class A than that of the parameter of sulphate is exceeded and if this parameter does not exceed a maximum of 4,500mg/kg DM.

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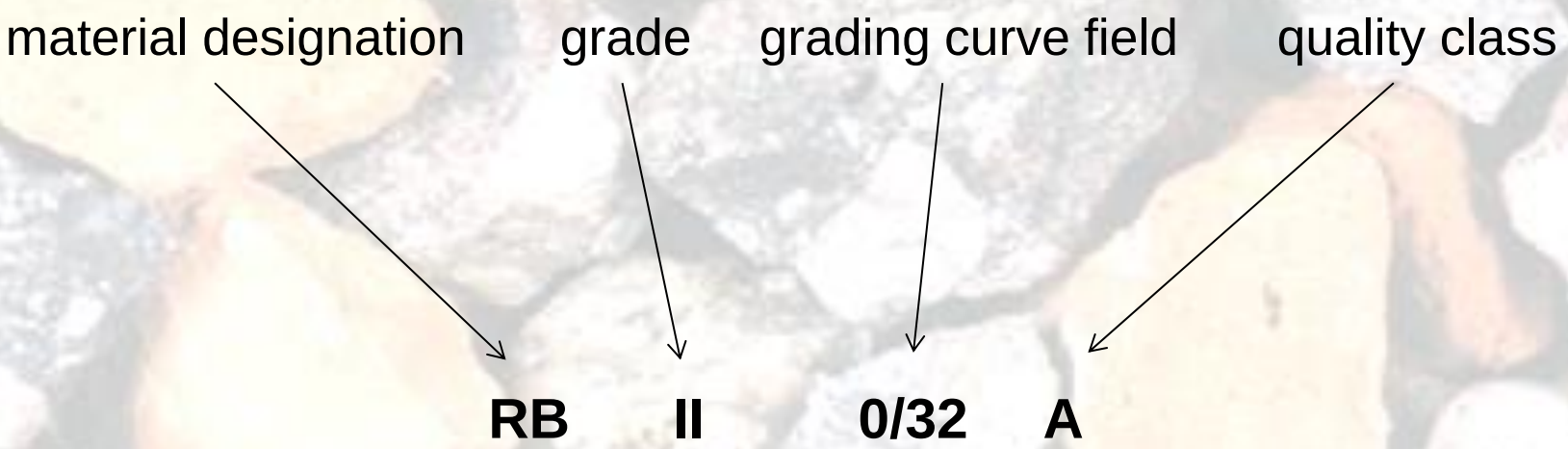
Guideline for Recycled Construction Material



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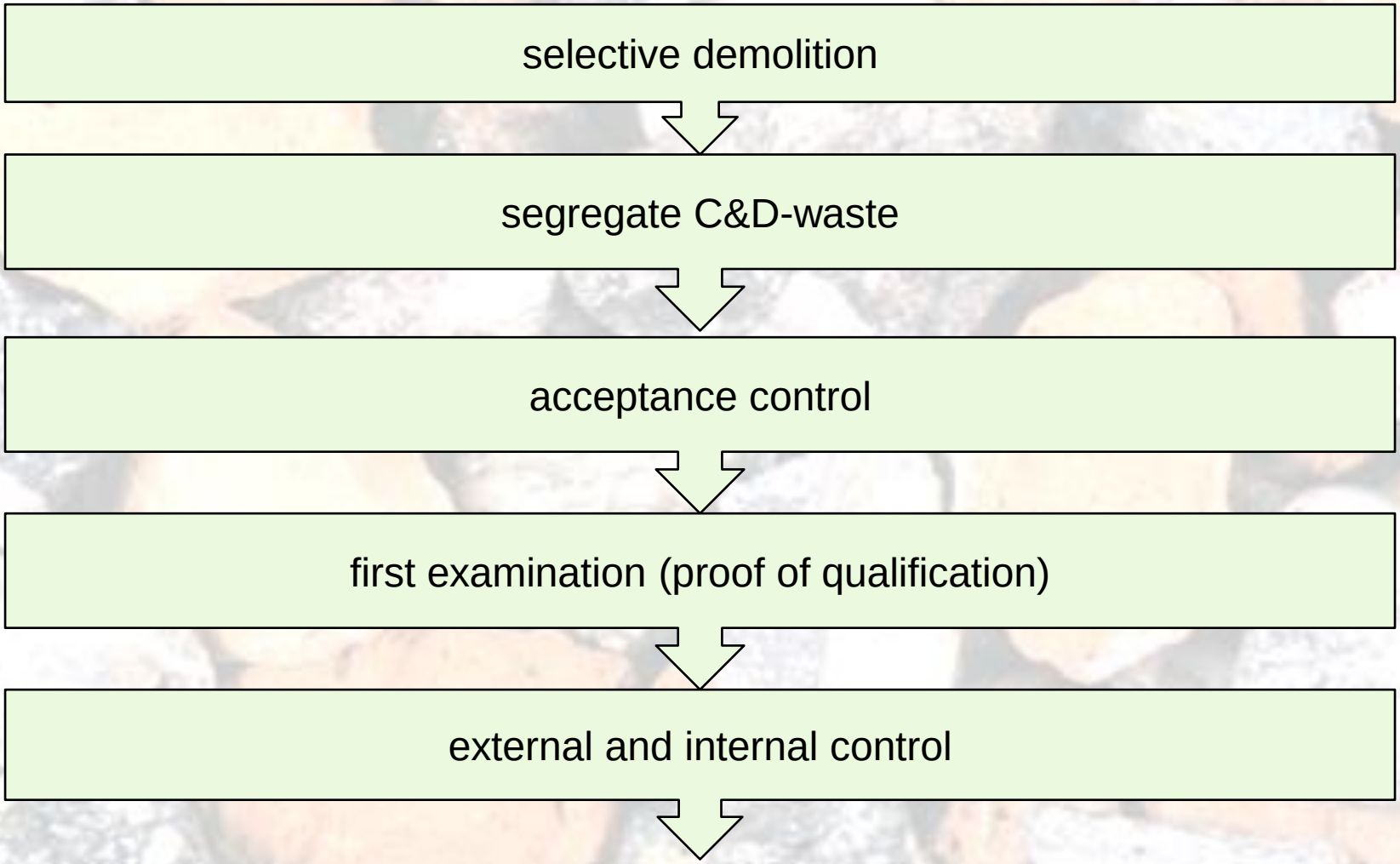
Österreichischer Baustoff-Recycling Verband

Qualitymanagement



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Qualitymanagement

acceptance control

- evaluation of origin and possible contaminations of the demolition waste
- accept only appropriate and authorized materials
- documentation of the first inspection

sorting

- pre-sorted in order to classify them according to their quality
- pre-sorted materials have to be stored separately

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Qualitymanagement

external control

- charge of an independent laboratory
- examination report
- result report
- operating and result report of the internal control

internal control

- regular operating reports
- regular result reports
- must be presented to the ÖGSV

Dipl.-Ing. Martin Car
Austrian Association for the Recycling of Building Materials

Qualitymanagement

Quality Seal on Recycled Construction Materials

Its award is suspect to periodic external and internal quality assurance reviews as specified.

CE:

Declaration by the manufacturer that the product meets all the appropriate provisions of the relevant legislation implementing certain European Directives.

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Quality marks for recycled construction materials

Dipl.-Ing. Martin Car

Österreichischer Baustoff-Recycling Verband

International Conference
October 9th - 10th 2014
Tallinn, Estonia

Quality marked recycled construction materials

ÖSTERREICHISCHER GÜTESCHUTZVERBAND RECYCLING-BAUSTOFFE

Autorisiert zur Vergabe des Gütezeichens für Recycling-Baustoffe

GÜTEGESCHÜTZTE RECYCLING-BAUSTOFFE UND MOBILE RECYCLING-ANLAGEN

APRIL 2014

Das vorliegende Verzeichnis führt alle dem Güteschutz unterliegenden und nach der **„Richtlinie für Recycling-Baustoffe, 8. Auflage"** geprüften **Recycling-Baustoffe** an. Weiters sind jene **mobilen Recycling-Anlagen** angeführt, welche nach der **„Richtlinie für die mobile Aufbereitung von mineralischen Baurestmassen und Bodenaushubmaterial, 1. Auflage"** geprüft und mit dem Gütezeichen für mobile Recycling-Anlagen ausgezeichnet sind.

Die in der Liste angeführten Recycling-Materialien können mit dem

GÜTEZEICHEN

„RECYCLING-BAUSTOFFE"

und die mobilen Recycling-Anlagen können mit dem

GÜTEZEICHEN

„MOBILE RECYCLING-ANLAGEN"

(in Preislisten und Lieferscheinen etc.) gekennzeichnet werden.

Die Liste wird periodisch aufgelegt und ist über den Österreichischen Güteschutzverband sowie über Internet (http://brv.at) unentgeltlich zu beziehen.

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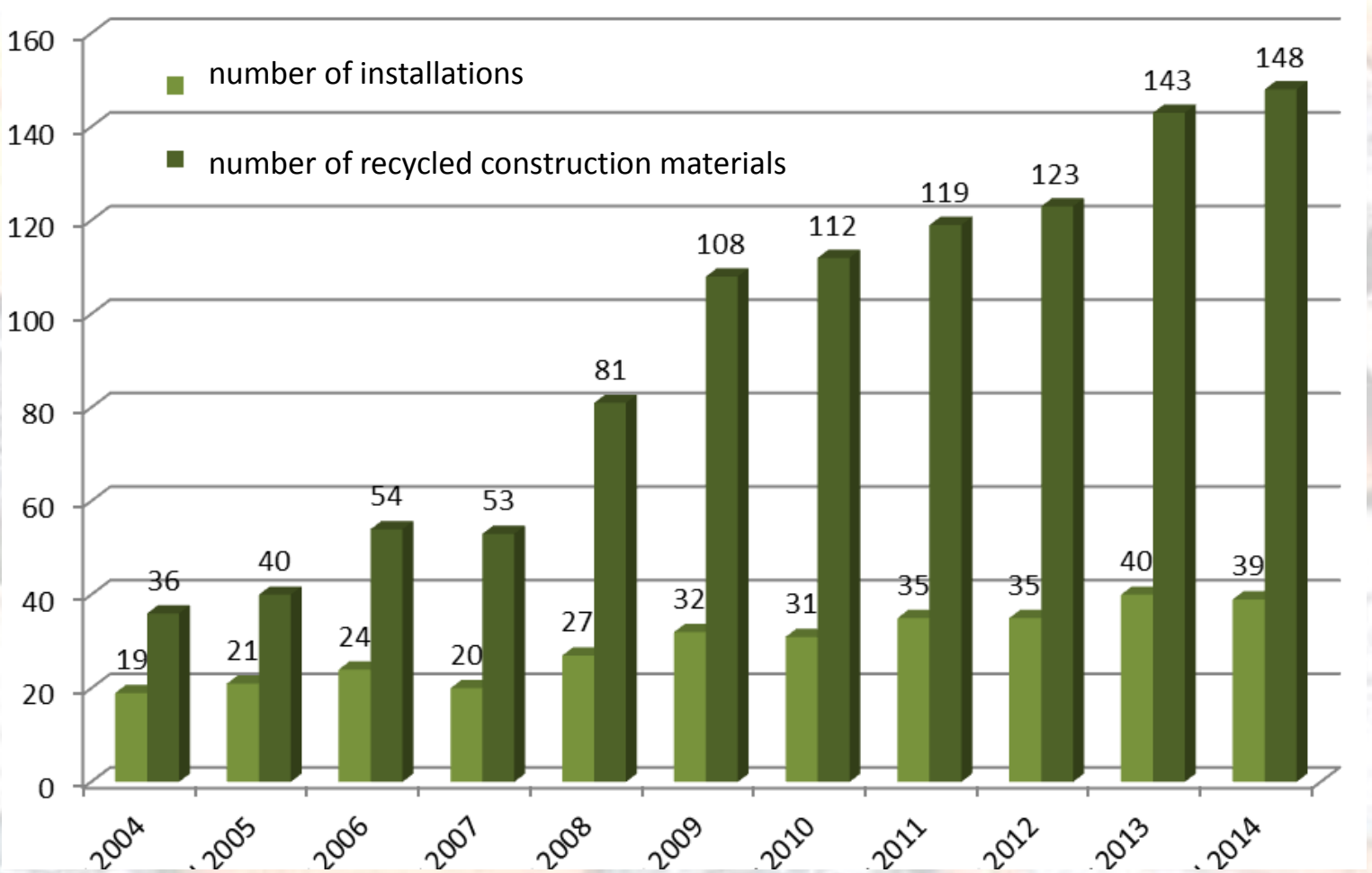
Quality marked recycled construction materials



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Österreichischer Baustoff-Recycling Verband

Quality and use

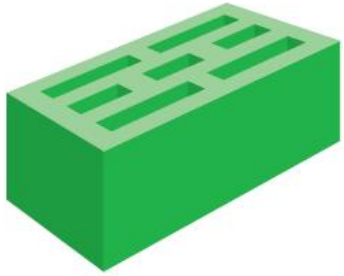
RZ - Recycled brick sand; recycled brick

RZ

Recycled sand from bricks; recycled gravel from bricks

Qualitätsbaustoff für

Zuschlagstoff für die Produktion von Mauerwerksteinen, Beton u. Leichtbeton; Stabilisierungen, Drainageschichten, Füllungen, Schüttungen



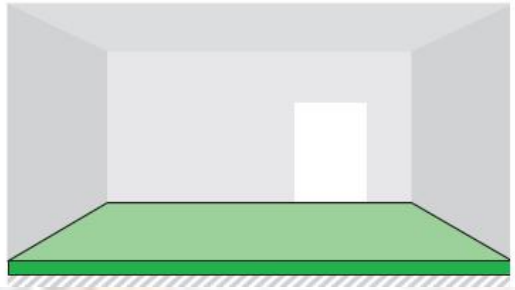
RHZ – Recycled brick sand as well as brick gravel gained from above-ground construction

RHZ

Recycled sand from bricks used for above ground structures; recycled gravel from bricks used for above ground structures

Qualitätsbaustoff für

Zuschlagstoff für die Produktion von Mauerwerksteinen, Beton u. Leichtbeton; Stabilisierungen, Füllungen, Schüttungen, Estriche



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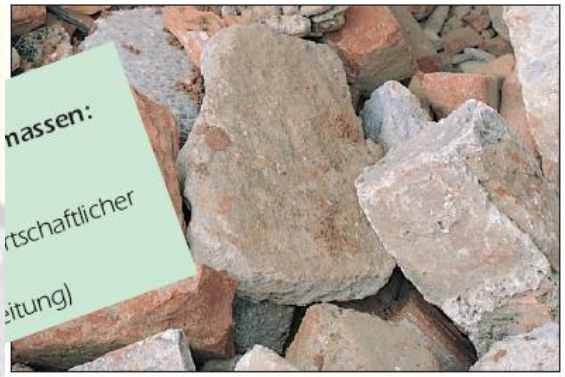
Quality and use

RH – Recycled sand or gravel from above-ground construction

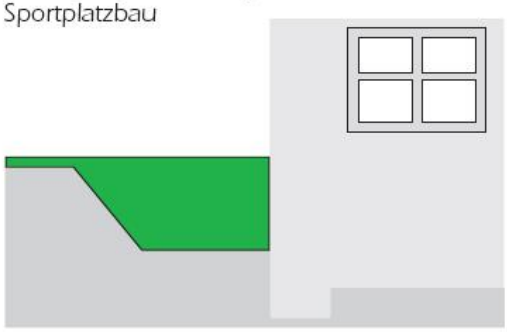


RH

Recycled sand from above ground structures; recycled gravel from above ground structures

Qualitätsbaustoff für

stabilisierte Schüttungen,
stabilisierte Künettenverfüllungen,
Bauwerkshinterfüllungen,
Sportplatzbau



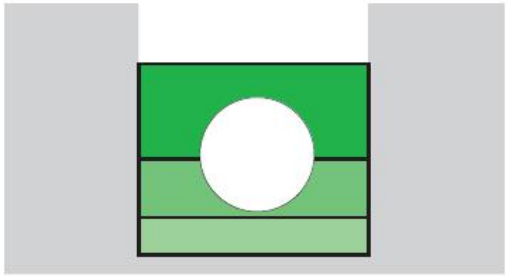
RMH – Recycled mineral demolition wastes from above ground construction

RMH

Recycled mineral demolition waste from above-ground structures

Qualitätsbaustoff für

Künettenverfüllungen, Hinterfüllungen,
Schüttungen, Sportplatzbau-Drainage



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Österreichischer Baustoff-Recycling Verband

Quality and use

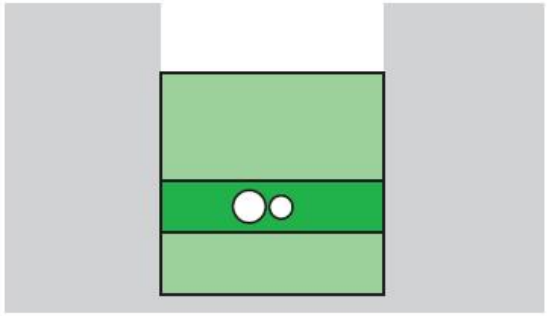
RS – Recycled sand

RS

Recycled sand

Qualitätsbaustoff für

die Bettung von Energie- und Fernmelde-kabeln (Kabelsand), von Leitungsrohren, z.B. von Kanal-, Gas- und Wasserleitungsrohren; sowie für weitere Infrastruktureinrichtungen



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Österreichischer Baustoff-Recycling Verband

Quality and use

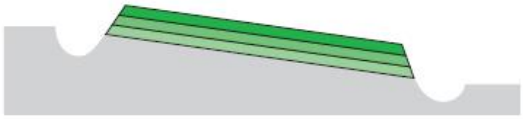
RA – Recycled crushed asphalt granulate

RA

Recycled crushed asphalt granulate

Qualitätsbaustoff für

ungebundene obere Tragschichten,
ungebundene untere Tragschichten,
gebundene Tragschichten,
landwirtschaftlichen Wegebau,
Zuschlagstoff für Asphaltproduktion



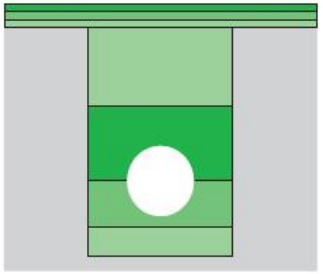
RB – Recycled crushed concrete granulate

RB

Recycled crushed concrete granulate

Qualitätsbaustoff für

ungebundene obere und untere Tragschichten, zementgebundene Tragschichten, landwirtschaftlichen Wegebau, Zuschlagstoff für Betonproduktion, hochwertiges Künettenfüllmaterial, Drainageschichten



Dipl.-Ing. Martin Car

Quality and use

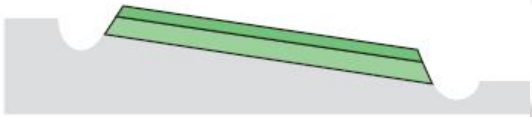
RAB – Recycled crushed mixed asphalt and concrete granulate

RAB

Recycled crushed mixed asphalt and concrete granulate

Qualitätsbaustoff für

ungebundene obere Tragschichten,
ungebundene untere Tragschichten,
gebundene Tragschichten,
landwirtschaftlichen Wegebau



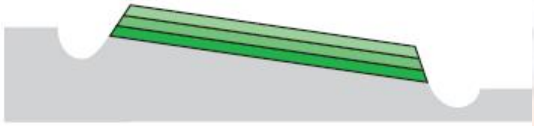
RM – Recycled crushed granulate mix of concrete and asphalt.

RM

Recycled crushed granulate mix of concrete and/or asphalt with a maximum content of stone (natural and/or recycled) of 50%

Qualitätsbaustoff für

ungebundene obere Tragschichten,
ungebundene untere Tragschichten,
gebundene Tragschichten



Dipl.-Ing. Martin Car

Examples of the modern use of recycled construction materials

FSV-VI-003-LB Seite 1

Leistungsbeschreibung Verkehrsinfrastruktur

Leistungsbeschreibung gedruckt am 03.10.2014

LGPosNr.	HK	Positionsstichwort	Quelle	EH

1.6.2 Recycling-Baustoffe

Bei der Durchführung können die für die jeweiligen Leistungen geeigneten Recycling-Baustoffe verwendet werden. Für diese müssen die erforderlichen Qualitätsnachweise erbracht werden und müssen den Anforderungen der Richtlinie für Recycling-Baustoffe des Österreichischen Güteschutzverbandes (1040 Wien, Karlsgasse 5, www.brv.at) entsprechen.

… 1.6.2 recycled construction materials
Suitable recycling construction materials can be used. For this quality certifications must be provided and must meet the requirements of the directive for recycled construction materials of the Austrian Association for the Recycling of Building Materials (1040 Vienna, Karlsgasse 5, www.brv.at).

Dipl.-Ing. Martin Car

Österreichischer Baustoff-Recycling Verband

Examples of the modern use of recycled construction materials

FSV-VI-003-LB Seite 1

Leistungsbeschreibung Verkehrsinfrastruktur

Leistungsbeschreibung gedruckt am 03.10.2014

LGPosNr.	HK	Positionsstichwort	Quelle	EH

1.6.3 Verwertung von Böden

Bei der Verwertung oder Wiederverwendung von Böden ist nach dem Merkblatt "Verwertung von Bodenaushubmaterial", herausgegeben vom Österreichischen Baustoff-Recycling Verband, 1040 Wien, Karlsgasse 5, www.brv.at, vorzugehen.

… 1.6.3 Recovery of grounds

Soils should be recycled or reused according to the leaflet "recovery of excavated soil material", published by the Austrian Construction Materials Recycling Association.

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LGPosNr.	HK	Positionsstichwort	Quelle	EH
151510M		**Zusatzmaterial Recycling RA 0/32 liefern**		
		Nicht in Teilausgabe enthalten.		
151510N		**Zusatzmaterial Recycling RB 0/22 liefern**		
		Nicht in Teilausgabe enthalten.		
151510O		**Zusatzmaterial Recycling RB 0/32 liefern**		
		Nicht in Teilausgabe enthalten.		
151510P		**Zusatzmaterial Recycling RAB 0/22 liefern**		
		Nicht in Teilausgabe enthalten.		
151510Q		**Zusatzmaterial Recycling RAB 0/32 liefern**		
		Nicht in Teilausgabe enthalten.		
151510R		**Zusatzmaterial C90/3 0/32 liefern**		
		Nicht in Teilausgabe enthalten.		

LB-Version: 3 *Geändert*

Änderung: Neue Position

151510M deliver additional material recycling RA 0/32

151510N deliver additional material recycling RA 0/22

151510O deliver additional material recycling RB 0/32

151510P deliver additional material recycling RAB 0/22

151510Q deliver additional material recycling RAB 0/32

151510R deliver additional material recycling C90/3 0/32

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Standardisierte Leistungsbeschreibung

Kennung: HB Version: 019

Leistungsbeschreibung Hochbau

5813	**Erdarbeiten**
	Recycling-Baustoffe:
	Recycling-Baustoffe entsprechen der Richtlinie für Recycling-Baustoffe des Österreichischen Baustoff-Recycling Verbandes, 1040 Wien, Karlsgasse 5.

… 5813 earthwork
recycled construction materials:
Recycled construction materials have to be in accordance with the Guideline for Recycled Construction Material of the Austrian Association for the Recycling of Building Materials,1040 Vienna, Karlsgasse 5.

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Standardisierte Leistungsbeschreibung

Kennung: HB Version: 019

Leistungsbeschreibung Hochbau

2. Verwerten oder Deponieren:

Baurestmassen werden grundsätzlich verwertet. Wenn dies aus wirtschaftlichen oder technischen Gründen nicht möglich ist, werden Baurestmassen ordnungsgemäß deponiert.

Für die Verwertung wird der Stand der Technik (z.B. die Richtlinien für Recycling-Baustoffe, herausgegeben vom Österreichischen Baustoff- Recycling Verband, Karlsgasse 5, 1040 Wien) berücksichtigt.

Recycling or landfilling:
Construction waste is generally recycled. If this is not possible for economic or technical reasons, demolition and construction waste will be properly disposed.
For recovery the state of the art (eg, the published Guideline for Recycled Construction Material of the Austrian Construction Materials Recycling Association, 1040 Wien) has to be ensured.

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Standardisierte Leistungsbeschreibung

Kennung: HB Version: 019

Leistungsbeschreibung Hochbau

030011B **Zuordnung Bodenaushubmaterial AG zu LG03**

Der Auftraggeber (AG) stellt dem Auftragnehmer Prüfberichte inklusive der chemischen Analyse für das Bodenaushubmaterial (Aushub) einschließlich der Zuordnung zu den Einbauklassen nach dem Merkblatt „Wiederverwendung/Verwertung von Bodenaushubmaterial“ (Richtlinien für Recycling-Baustoffe, herausgegeben vom Österreichischen Baustoff- Recycling Verband, Karlsgasse 5, 1040 Wien) zur Verfügung.

… 030011B assignment excavated soil material AG to LG03
The client provides the contractor with test reports including the chemical analysis of excavated soil material (excavation) including the assignment to the installation classes according to the leaflet "Reuse / Recycling of excavated soil material" (Guideline for Recycled Construction Material of the Austrian Association for the Recycling of Building Materials).

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RVS 08.15.02
Unbound Sub-Bases with Asphalt-Aggregates

… Unbound bottom or upper Sub-Bases from rock grain mixtures of natural or recycled grain mixtures or industrial made grain mixtures and their mixtures with recycled Asphalt-Aggregates, respectively ≤ 50 mass percent are regulated in RVS 08.15.01.

Definitions and environmental compatibility of recycled construction materials are based on the regulations of Guideline for Recycled Construction Material. …

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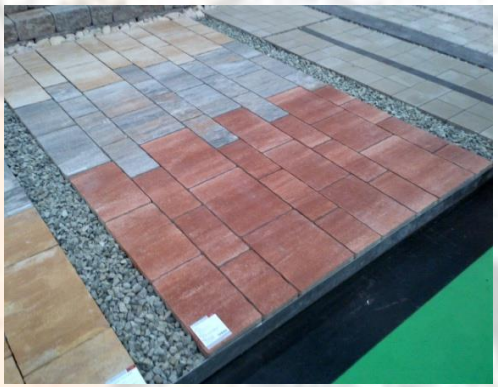

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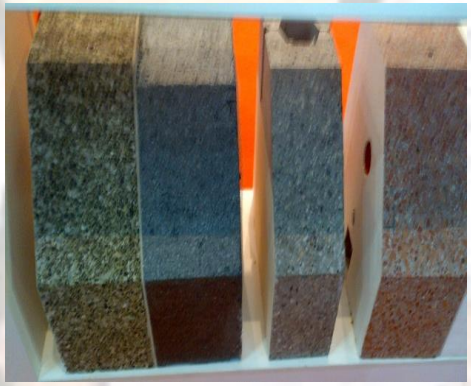

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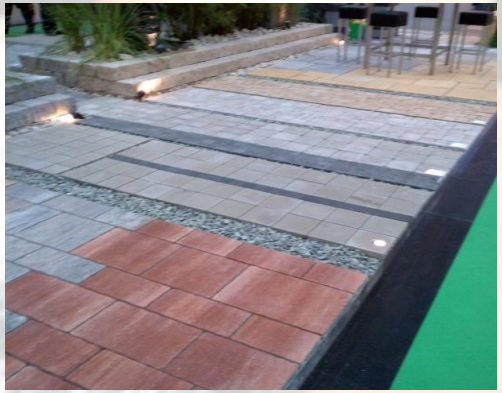

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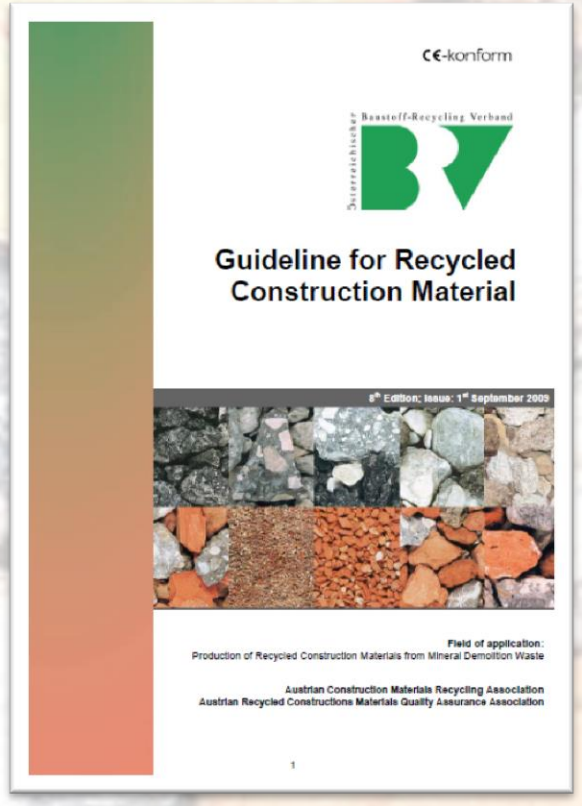
English papers of the Austrian Construction Materials Recycling Association



Guideline for Recycled Construction Material

Austrian Construction Materials Recycling Association – reference booklet

available at brv@brv.at or www.brv.at

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www.brv.at

EQAR: European Quality Association for Recycling

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Thank you for
your attention!

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